Amendments to the Claims:

1. (Currently amended) A method for detecting an abnormality in a host medium comprising:

illuminating the host medium at a plurality of different positions;

detecting signals following propagation through the host medium and the abnormality within the host medium;

creating a shadow image based upon the detected signals in which the abnormality is depicted as a suspicious region;

illuminating at least that portion of the host medium that contains the suspicious region with frequency-swept modulated signals, following creation of the shadow image;

detecting the frequency-swept modulated signals following propagation through at least that portion of the host medium that contains the suspicious region; and

characterizing the abnormality based upon the detected frequency-swept modulated signals.

2. (Previously presented) A method according to Claim 1 wherein said initial illumination step comprises illuminating the host medium at a plurality of different positions with signals modulated at a frequency selected from a range of frequencies.

3. (Currently amended) A method according to Claim ~~1~~2 wherein, during said second illumination step, the signals are frequency-swept modulated across a larger range of frequencies than the range of frequencies from which the modulation frequency of the signal that initially illuminates the host medium is selected.

4. (Previously presented) A method according to Claim 1 wherein said initial illumination step comprises illuminating the host medium with signals having at least two different wavelengths.

5. (Previously presented) A method according to Claim 4 wherein said initial detecting step comprises detecting at least an amplitude of the signals following propagation through the host medium and the abnormality within the host medium.

6. (Previously presented) A method according to Claim 5 further comprising forming a ratio of the amplitude of the signals detected during said initial detecting step at each of the different wavelengths.

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7. (Previously presented) A method according to Claim 1 wherein said step of illuminating at least that portion of the host medium that contains the suspicious region comprises illuminating at least that portion of the host medium that contains the suspicious region with signals having at least two different wavelengths.

8. (Previously presented) A method according to Claim 7 further comprising a step of determining a P-criteria for at least one of a plurality of positions within at least that portion of the host medium that contains the suspicious region following said second detecting step, wherein the P-criteria is at least partially based upon coefficients of absorptivity for signals having the different wavelengths at the respective position.

9. (Previously presented) A method according to Claim 1 further comprising a step of determining an S_{var}-criteria for at least one of a plurality of positions within at least that portion of the host medium that contains the suspicious region following said second detecting step, wherein the S_{var}-criteria is at least partially based upon a variation in percent concentration of oxygenated hemoglobin between the abnormality and the host medium and a variation in total hemoglobin concentration between the abnormality and the host medium at the respective position.

10. (Previously presented) A method according to Claim 1 wherein said second illuminating step comprises positioning a light source at a position offset from the suspicious region, and wherein said second detecting step comprises moving a detector along a linear path displaced from the suspicious region.

11. (Previously presented) A method according to Claim 1 wherein said second illuminating step comprises positioning a light source at a position offset from the suspicious region, and wherein said second detecting step comprises moving a detector through a plurality of positions including at least one position aligned with the suspicious region.

12. (Previously presented) A method according to Claim 1 wherein said second illuminating and detecting steps comprise:

positioning a light source and a detector on opposite sides of the host medium in an offset relation; and

moving the light source and the detector in tandem such that the offset relation is maintained.

13. (Previously presented) A method according to Claim 1 further comprising:

illuminating a portion of the host medium at a plurality of different positions displaced from the suspicious region with signals having at least two different wavelengths;

detecting the signals following propagation through the host medium; and

determining a reference scattering coefficient and a reference absorption coefficient for the host medium based upon the detected signals.

14. (Currently amended) A method according to Claim 13 further comprising determining an absorption coefficient and a size of the abnormality based on setting a scattering coefficient of the abnormality equal to the reference scattering coefficient and further based upon the frequency-swept modulated signals that are detected following propagation through at least that portion of the host medium that contains the suspicious region.

15. (Previously presented) A method according to Claim 14 further comprising determining a location of the abnormality within the host medium following said second detecting step.

16. (Previously presented) A method according to Claim 1 wherein the host medium is a breast, and wherein the method further comprises compressing the breast between a pair of plates prior to said initial illumination step.

17. (Previously presented) A method according to Claim 1 wherein the host medium is a breast, and wherein the method further comprises applying oil to the breast prior to said initial illumination step.

18. (Currently amended) An apparatus for detecting an abnormality in a host medium comprising:

a light source for generating signals that illuminate the host medium at a plurality of different positions;

a modulator for applying frequency-swept modulation to the signals generated by said light source prior to illuminating the host medium;

a detector for detecting signals following propagation through the host medium and the abnormality within the host medium;

a display for presenting a shadow image based upon the detected signals in which the abnormality is depicted as a suspicious region; and

a positioner for positioning said light source relative to the host medium such that said light source illuminates the host medium at the plurality of different positions, wherein said positioner initially positions said light source at a plurality of different positions that cover a broad portion of the host medium to facilitate generation of the shadow image, and wherein said positioner subsequently positions said light source proximate that portion of the host medium

that includes the suspicious region, following generation of the shadow image, to facilitate characterization of the abnormality.

19. (Previously presented) An apparatus according to Claim 18 wherein said positioner also positions said detector relative to the host medium, wherein said positioner maintains said light source and said detector in alignment while initially positioning said light source and said detector at a plurality of different positions that cover a broad portion of the host medium to facilitate generation of the shadow image, and wherein said positioner maintains said light source and said detector in an offset relation while subsequently positioning said light source and said detector proximate that portion of the host medium that includes the suspicious region to facilitate characterization of the abnormality.

20. (Previously presented) An apparatus according to Claim 18 wherein said positioner comprises at least two X-Y linear motorized stages.

21. (Previously presented) An apparatus according to Claim 18 wherein said modulator comprises a frequency-swept network analyzer.

22. (Previously presented) An apparatus according to Claim 18 wherein the host medium is a breast, and wherein the apparatus further comprises a pair of plates separated by a distance sufficient to receive the breast of a patient.

23. (Previously presented) An apparatus according to Claim 22 further comprising an adjustable belt extending between said plates proximate the breast, said adjustable belt capable of being tightened about the breast such that the breast fills a region defined by said pair of plates and said adjustable belt, thereby facilitating imaging of the breast.

24. (Previously presented) An apparatus according to Claim 22 further comprising an opaque material that fills a region defined by said plates that is unfilled by the breast.

25. (Previously presented) An apparatus according to Claim 24 further comprising a background light source for illuminating any regions of separation between said opaque material and the breast.

26. (Previously presented) An apparatus according to Claim 22 further comprising a separation detector for measuring the distance by which said pair of plates are separated.

27. (Previously presented) An apparatus according to Claim 18 wherein said detector is a photomultiplier tube.

28. (Previously presented) An apparatus according to Claim 18 further comprising a diaphragm for selectively controlling an intensity of light that is presented to said detector.

29. (Previously presented) An apparatus according to Claim 18 wherein said light source comprises a first fiber optic pigtail infrared diode laser capable of emitting signals having a power level of between 100 milliwatts and 500 milliwatts and a wavelength of between 810 nanometers and 840 nanometers.

30. (Previously presented) An apparatus according to Claim 29 wherein said light source comprises a second fiber optic pigtail infrared diode laser capable of emitting signals having a power level of between 100 milliwatts and 500 milliwatts and a wavelength of between 670 nanometers and 700 nanometers.

31. (Previously presented) An apparatus according to Claim 18 further comprising:

a reference light source for also illuminating the host medium with reference signals;

a reference detector for detecting the reference signals following propagation through the host medium and the abnormality within the host medium; and

a shutter for preventing further detection by said detector if said reference detector detects that an amplitude of the reference signals exceeds a predetermined threshold.

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32. (Previously presented) An apparatus according to Claim 31 wherein said reference light source comprises a fiber optic pigtail diode laser operating in a continuous wave mode and capable of emitting signals having a wavelength of between 950 nanometers and 980 nanometers.

Claims 33-47 (Canceled).